Chapter 18. Meeting 18, Delay and Reverb

18.1. Announcements

• Recording session this Monday, 23 April, in Killian Hall
  Engineering crew: four students [names removed for privacy]
  Instrumentation: piano and horn
  Location: Killian Hall
• Need four person schlep crew for 3:00 PM on Monday
• Next quiz will be Wednesday, 25 April

18.2. Recording Session 1 Review

18.3. Reading: Katz: Aesthetics Out of Exigency: Violin Vibrato and the Phonograph

• What is a phonograph effect?
• What sources of evidence does Katz bring together to demonstrate the changes in vibrato practice?
• Katz offers five alternative theories on why vibrato usage increased. What are they, and why are each of them rejected?
• Why was vibrato useful for violinists making recordings?
• Are there other examples of necessity (or practicality) being the mother of aesthetics?

18.4. Processing Signals: Concepts

• Dry (unprocessed) and wet (processed)
• Sometimes replace dry with wet
- Sometimes mix a percent of wet and with dry

**18.5. Processing Signals: By Replacement**

- Three terms: serial processing, inserts, in-line processing
- Applications: EQ, Dynamic Effects (compression, limiting, expansion, gating), Time Shifting, Spectral Effects

**18.6. Processing Signals: By Mix**

- Three terms: parallel processing, auxiliaries, side-chain processing
- Applications: Time-based effects
- Side-chain can always be pre or post channel fader

**18.7. Parallel Processing in Live**

- Use “Insert Return Track” to create (only two are permitted in Live Intro)
- Small, unlabeled boxes appear in each track’s lane to show return level (which can be automated)
- Pre- and post-signal routing selected in the Return track, not the source track
### 18.8. Time-Based Processors

- Reverbs
- Delays
- Flangers, chorus, and phasing

### 18.9. Time-Based Processors: Common Attributes

- All employ delays
- All are often processed in parallel (with an auxiliary track or with mix controls)
- All are often best used in stereo rather than mono
- All are easily over-used
18.10. Reverb: Goals

- Coherence: reconnecting tracks recorded in isolation or without space
- Recreating an acoustic space
- Special effects

18.11. Reverb: Parameters

- Time domain graph

- Decay: duration of reverberations (time of tail to fall -60 dB)
- Size: color or type of diffusion algorithms
- Pre-Delay: time before reverb starts, a bit (30 ms) is generally needed to get reverb away from dry signal
• Early reflections
• Diffusion
• Wet / dry mix

18.12. Reverb in Live

• Basic reverb plugin

• Pre-processing filters
• Early reflections controlled by “Shape” parameter: higher values mean faster decay of early reflections
• Spin modulates the early reflections (not recommended)
• High and low frequencies in reverberation can have scaled decays
• Freeze/Flat/Cut: special effect of sustained reverb
• Density and scale: adjust reverberations

• Reflect and Diffuse: level setting for early reflections and reverberations

18.13. Reverb: Two Processing Approaches

• Algorithmic (cheap, fast)

• Sampling or convolution based (expensive, slow)


• Reverb plugins should (almost) always be instantiated in auxiliary tracks and used with sends

• When in an aux track, reverb plugins should always be at 100% wet

• Having many tracks share a single reverb gives a sense of cohesion or shared space

• Aux sends permit adjusting how much of each channel will be processed as reverb

• Aux sends should (almost always) be post fader

• Aux track permits global reverb adjustments (level, filtering)

• Aux sends permit using a stereo reverb with a mono channel strip

18.15. Reverb: Two Needs

• Cohesion

  • Decay: under a second; pre-delay: 5 to 10 ms

  • A short reverb to add ambience

  • Can simulate leakage

  • Can help tracks glue together

• Space

  • Decay: over a second; pre-delay: 30 to 70 ms

  • A longer reverb to simulate an acoustic space

  • Places a recording in an environment
18.16. Reverb: Algorithm Types

- Often determine arrangement of early reflections and timbre of reverberations
- Good to start with a preset then adjust
- Standard spaces: halls, rooms, chambers, ambience
- Unusual spaces: cathedrals, bathrooms
- Mechanical reverb: springs and plates

18.17. Reverb: Filtering

- All reverbs need filtering
- Carefully shape (and reduce) high frequencies, avoiding metallic sounds
- Avoid extra low frequency reverb
- Use a full-function EQ to shape reverb
- Filtering should be tailored to the music

18.18. Reverb: Applications

- Not all tracks need reverb
- Use a shorter decay time than you think necessary
- Use sparingly on low-end tracks (kicks, basses)
- Use less reverb than you think necessary (mastering likely to increase)

18.19. Reverb: Auditioning

- Start and stop tracks to listen to reverb alone
- Vary aux channel level to boost level to adjust timbre, then reduce

18.20. Microphone Positioning: Exercise

- Exercise: You are to recording a piano and a horn. You have 6 AT 4041, 4 AKG 414, 2 Earthworks TC20mp, and 2 Sennheiser MD-421.
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